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A First Inventory of the Lichens of Mangaia, and an Updated Checklist for the Cook Islands

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ABSTRACT

A first checklist is provided for the lichenised fungi of Mangaia. Based on field work undertaken during November 2024, when 144 collections were made over a 5-day period, 66 species are recognised from Mangaia, including 43 new national records for the Cook Islands. A number of the new records reported here for Mangaia are first reports for islands of the wider Pacific Ocean or south-western Polynesia. The new Mangaia records comprise 37 genera from 22 families. Seven genera include three or more species: *Anisomeridium*, *Cratiria*, *Dirinaria*, *Graphis*, *Physcia*, *Pyrenula* and *Ramalina*. Eight collections could not be identified to species level. A remarkable specimen is that of *Gassicurtia manguensia* Marbach which was made from the trunk of *Fagraea berteroana* A.Grey ex Benth. in Mangaia. Previously this taxon was only known from the type collection from mangrove bark in south-eastern Brazil. An up-to-date Cook Island checklist is provided in which 156 taxa are recognised by combining the new Mangaia records with earlier records mainly from Rarotonga. The most species-rich genera in the Cook Islands are *Pertusaria* (8 taxa), *Porina* (11), *Pyrenula* (13), and *Ramalina* (8).

1 | Introduction

Mangaia (–21.9352°S, –157.9166°W), with a land area of 51.8 km^2 is the second largest island in Cook Islands and a member of the Southern Cooks Group in the south-western Pacific Ocean. Rarotonga, the largest of the Cook Islands, is approximately 200 km to the west of Mangaia. To the east are the archipelagos of French Polynesia, with the closest islands being Rimatara, Tubai Islands (330 km distant), and to the north-east is Bora Bora, Society Islands (880 km distant). Mangaia is located 3,100 km to the north-east of New Zealand.

Although a small island, Mangaia has variable topography with coastal makatea (uplifted coral and limestone derived rock) terraces, behind which are numerous wetlands, and the interior is the remnant of a weathered subaerial basaltic volcano that rises to 169 m elevation at Rangimotia. The outcrops of volcanic basalt, which are small and scattered, are mostly overtopped and heavily shaded by introduced plant species. The indigenous vegetation of Mangaia has been described by Merlin (1991) and Franklin and Merlin (1992) as mixed indigenous forest dominated by *Elaeocarpus floridanus* Hemsl., disturbed mixed forest dominated by *Hernandia moerenhoutiana* Guill. or *Cocos nucifera* L., *Pandanus tectorius* Parkinson shrubland, and *Barringtonia asiatica* L.) Kurz. coastal forest.

However, the vegetation today is highly modified and disturbed with extensive plantation forestry in the higher elevation central region (c. 10 km^2, covering c. 20% of the island) and roaming pigs (*Sus scrofa domesticus*) and goats (*Capra hircus*) being common (Figure 1). Central parts of the island (including Rangimotia) were once *Dicranopteris linearis* (Burm.f.) Underw. fernland with scattered shrubs but this is now overtopped by plantation forests of *Pinus caribaea* Morelet, acacia (*Acacia crassicarpa* A.Cunn. ex Benth. and *A. aulococarpa* A.Cunn. ex Benth.), and *Eucalyptus* spp. (Sykes 2016). While the pigs are mainly encountered in central areas of plantation forestry the goats are common in lowland

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FIGURE 1 | Modified and disturbed habitats on Mangaia. (A) Coastal *Pandanus* forest with the understory eaten out by goats. (B) *Dicranopteris* fernland on Rangimotu has been overplanted with plantation species such as *Pinus caribaea*.

and coastal areas and in many places have eaten out the understory leaving only mature plants of *Pandanus*, *Cocos*, and *Barringtonia*. Of relevance to goat browsing, Merlin (1991) describes the average relative dominance of indigenous ground cover species in 20 transects as >99%, but in areas frequented today by goats this is no longer the case and the ground is bare.

The first compilation of the lichens of the smaller Pacific islands (Elix and McCarthy 1998) listed 30 taxa for the Cook Islands. Those records were based largely on specimens collected in the late 19th and early 20th centuries, and most were identified by European lichenologists in the first half of the 20th century. In 1998, PMMcC and JAE, along with Dr Simone Louwhoff, visited Rarotonga, primarily to investigate Parmeliaceae and pyrenocarpous lichens. Specimens collected on that trip yielded 13 new taxa in *Buellia*, *Canoparmelia*, *Lecanographa*, *Pertusaria*, *Porina*, *Pseudocyphellaria*, *Pyrenula*, *Swinscowia* (as *Strigula*) and *Verrucaria*, these being described over the following 20 years (McCarthy 2000a; Louwhoff and Elix 2000; Archer and Elix 2015; Elix 2016; McCarthy and Elix 2018). In addition to the newly described taxa, numerous new national records collected in 1998, together with *Ramalina* species gathered in 2000–2010 (Blanchon and de Lange 2011), brought the known diversity of lichens in the Cook Islands up to 113 taxa (McCarthy and Elix 2018). There is only one previous lichen record from Mangaia, *viz. Ramalina luciae* Molho (Blanchon and de Lange 2011).

A visit to Mangaia by PBH as part of the Cook Islands Government *Te Rangi Atea Science Expo*, 25–29 November 2024, provided the opportunity to make collections of lichens from an island which had previously been poorly studied. The results of this field-based study are presented here in the form of a checklist.

2 | Materials and Methods

The study is based chiefly on 144 specimens collected by the third author during a 5-day visit to Mangaia in November 2024. Table 1 provides details of the 18 locations from where the lichens were sampled. The approach to sampling was to ensure sites were selected from around the island with a focus on those with indigenous vegetation cover. An inland road across the island and the high point of Rangimotia were also sampled, although these were mainly exotic pine and acacia plantations.

These collections have been examined and identifications made by lichenologists PMMcC and JAE. Specimens are deposited in Allan Herbarium (CHR) with some duplicates in the Australian National Herbarium (CANB). Additional reference herbarium material, chiefly from CANB, was also consulted. Anatomical and morphological observations were undertaken using light microscopy, with thin hand-cut sections mounted in water, 10% KOH (K), lactophenol cotton blue, Lugol's iodine after pre-treatment with dilute KOH, 50% HNO3 (N) and ammoniacal erythrosin.

Notes are provided on species distributions in the Pacific Ocean region utilising the summary information provided in a checklist of Pacific Island lichens by Elix and McCarthy (2008), collections documented in the Consortium of Lichen Herbaria (2025), and other literature. An up-to-date Cook Island checklist is provided in which 156 taxa are recognised by combining the new Mangaia records with earlier records from the Cook Islands. This checklist is presented as an Appendix.

3 | Results and Discussion

In total, 144 lichen collections were made from Mangaia, comprising 22 families, 37 genera and 66 species. Highlighting the importance of documenting lichen diversity on Pacific islands, these records from Mangaia also represent 43 new national records for the Cook Islands (Appendix 1). A number of the new records reported here for Mangaia are also first reports for islands of south-western Polynesia (19 taxa) or the wider Pacific Ocean region (3 taxa). With much of the central area of Mangaia in plantation forestry the majority of specimens were collected from coastal or littoral forest. The most common host trees from these habitats and the number of lichen taxa recorded from them are: *Cocos nucifera* (38 taxa), *Hibiscus tiliaceus* L. (21), *Pandanus tectorius* (15), and *Fagraea berteroana* (10), with these species all being relatively common on Mangaia. Three taxa were collected from makatea in coastal sites. Seven genera comprise three or more species: *Anisomeridium*, *Cratiria*, *Dirinaria*, *Graphis*, *Physcia*, *Pyrenula* and *Ramalina*.

Approximately 15–20 collections contained either indeterminate, sterile material, or old/depauperate fertile thalli without asci or spores; these specimens could not be identified with any degree of certainty, and their details are not cited below. On the other hand, eight clearly defined taxa are named to genus level (e.g. '*Arthonia* sp.'; Figure 2). However, we are unable to name the actual species, or even to suggest a more tentative identification. In the case of the unidentified *Porina* sp., this is most likely an undescribed taxon, but the small specimen would make a wholly inadequate holotype. As regards the other seven collections, we are insufficiently familiar

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TABLE 1 | Collection locations of lichens from Mangaia during field work undertaken 25–29 November 2024.

Collection locality	Latitude	Longitude	Elevation, m
Coastal Road, between airport and Oneroa. Historic track through forest, Mangaia	21°53′57″S	157°56'07″W	53
Tavaenga Road, near intersection with unnamed road, Mangaia	21°54′56″S	157°56′18″W	70
Unnamed Road near intersection with Tavaenga Road, Mangaia	21°55′10″S	157°56′32″W	70
Swamp, 700 m northeast of Tamarua, Mangaia	21°56′47″S	157°54′08″W	32
Coastal Road, near Tamarua, Mangaia	21°57′20″S	157°55′08″W	41
sea track, Coastal Road, near Tamarua, Mangaia	21°57′28″S	157°55′39″W	41
Oneroa Village Green, Oneroa, Mangaia	21°55′25″S	157°57′27″W	15
Rangimotia, Mangaia	21°55′40″S	157°55′22″W	165
Opposite Babes Place, Oneroa, Mangaia	21°55′49″S	157°57′36″W	12
Tavaenga Road, 250 m along road from Coastal Road corner, Kaumata, Mangaia	21°56′03″S	157°57′33″W	47
Corner Tavaenga Road and Coastal Road, 500 m south of Kaumata, Mangaia	21°56′07″S	157°57′37″W	9
Bush track between Temakatea to Tamarua Rd and Rangimotia Rd, Mangaia	21°56′23″S	157°56′22″W	61
Temakatea Village to Tamarua Village Road, 2 km from Tamakatea Village, Mangaia	21°56′25″S	157°56′36″W	51
Wetland east of Tamarua Village, Mangaia	21°56′49″S	157°54′11″W	6
Kaumata Village to Tamarua Village Road, 3 km from Kaumata Village, Mangaia	21°56′55″S	157°57′01″W	22
Lake Tiriara, 1 km west of Tamarua, Mangaia	21°57′02″S	157°55′40″W	38
500 m east of Tamarua Village, Mangaia	21°57′20″S	157°54′55″W	8
2 km west of Tamarua Village, Mangaia	21°57′29″S	157°56′02″W	37

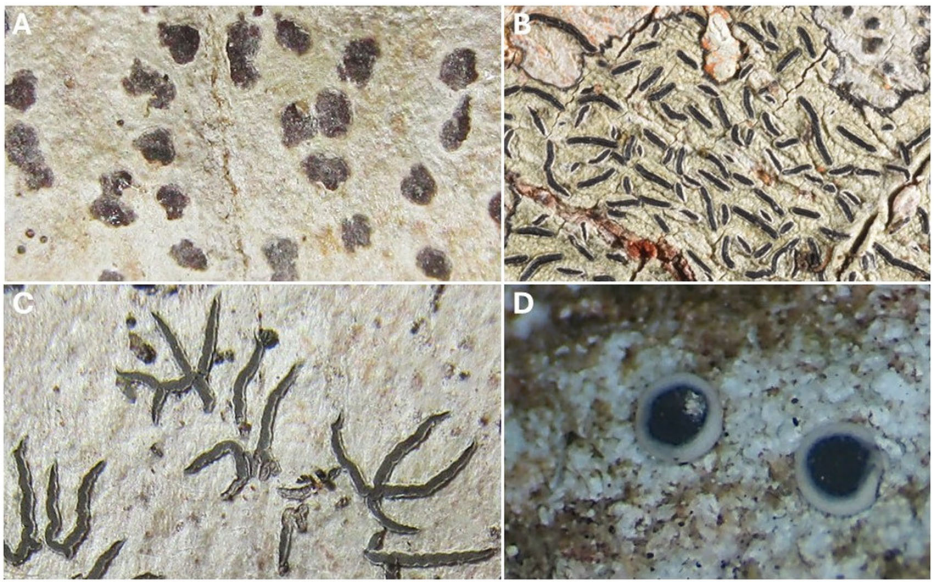

FIGURE 2 | Several specimens collected from Mangaia were indeterminate and require further research. (A) *Arthonia* sp.; (B) *Graphis* sp. A; (C) *Phaeographis* sp.; and (D) *Megalaria* sp.

with those genera across their global ranges. Short descriptions with likely diagnostic characters are provided here so that other researchers with relevant experience might be prompted to revisit and complete the identification of this material in Allan Herbarium (CHR).

Although some island groups in the south-west Pacific region have been studied in detail, for the vast majority of the 4,500 islands in the area their lichen diversity is poorly documented (Elix and McCarthy 2008). This lack of information limits understanding of biogeographic patterns and centres of biodiversity and therefore this checklist, like that recently provided for Niue (Elix et al. 2024), contributes to the broader understanding of Pacific island lichenology.

4 | Mangaia Lichen Checklist

4.1 | Arthoniaceae

Arthonia sp. (Figure 2)

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML96*, 27 November 2024, CHR 697173; *loc. id.*, *P. B. Heenan ML98b*,

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27 November 2024, CHR 697175; Tamarua, Mangaia, *P. B. Heenan ML121*, 28 November 2024, CHR 697197; *loc. id.*, *P. B. Heenan ML61*, 26 November 2024, CHR 697139; *loc. id.*, *P. B. Heenan ML122*, 28 November 2024, CHR 697198.

Notes: Thallus endophloeodal, to several centimetres wide, whitish to pale grey, with a grey-black prothallus, C–; photobiont *Trentepohlia*, the cells forming clusters; ascomata numerous, immersed, dull greenish black, epruinose, ±smooth, rounded or, more commonly, variously irregular in shape, 0.5–1.5 mm in maximum extent, immarginate; epihymenium K + dark olive; hymenium not inspersed with granular material or oil globules; hypothecium hyaline; paraphysoids anastomosing; asci 8-spored, broadly clavate to almost subglobose, thick-walled, with a large ocular chamber, 50–58 × 25–35 µm; ascospores hyaline, 5(–7)-septate, broadly fusiform or elongate-ellipsoid, straight or slightly bent, the median 1 or 2 cells often distinctly larger, 17–24 × 4–8 µm, with a thin perispore. On *Cocos nucifera* and *Pandanus tectorius*.

4.2 | Caliciaceae

Calicium hyperelloides Nyl.

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML107*, 27 November 2024, CHR 697183; *loc. id.*, *P. B. Heenan ML97*, 27 November 2024, CHR 697173.

Notes: Occurring in most tropical and warm-temperate regions, in the South Pacific this lichen is already known from Tonga (Elix and McCarthy 2008). On *Pandanus tectorius* bark in Mangaia.

Cratiria chloraceus Marbach

Specimens examined: Rangimotia Rd, Mangaia, *P. B. Heenan ML80*, 27 November 2024, CHR 697156; Lake Tiriara, Mangaia, *P. B. Heenan ML85*, 27 November 2024, CHR 697162.

Notes: Previously known from Australia, New Caledonia and Papua New Guinea (Marbach 2000; Elix 2016; Elix et al. 2017). Collected from branches of *Hibiscus tiliaceus* and an unknown tree.

Cratiria lauricassiae (Fée) Marbach

Specimens examined: Rangimotia Rd, Mangaia, *P. B. Heenan ML78a*, 27 November 2024, CHR 697154; Oneroa, Mangaia, *P. B. Heenan ML96*, 27 November 2024, CHR 697172.

Notes: Occurring on bark and wood in the Neotropics, South Asia, and tropical Australia (Elix 2011), this lichen is also rather common in the South Pacific, including Norfolk Island, New Caledonia, Tonga and Samoa (Elix and McCarthy 2008). On *Cocos nucifera* and *Hibiscus tiliaceus*.

Cratiria obscurior (Stirt.) Marbach & Kalb

Specimens examined: Kaumata, Mangaia, *P. B. Heenan ML40*, 26 November 2024, CHR 697120; Rangimotia Rd, Mangaia, *P. B. Heenan ML81*, 27 November 2024, CHR 697157.

Notes: Found on bark in most tropical regions and, in the Pacific, known from the Hawaiian Islands (Elix and McCarthy 2008). On *Fagraea berteroana* and *Hibiscus tiliaceus*.

Dirinaria aegialita (Ach.) B.Moore (Figure 3)

Specimen examined: Tavaenga Road, Mangaia, *P. B. Heenan ML142*, 29 November 2024, CHR 697218.

Notes: This pantropical lichen is common on bark and rock in coastal and montane habits (Elix 2011). It is common in many of the smaller Pacific islands (Elix and McCarthy 2008; Sipman 2018; McCarthy 2023; Galapagos Species Database 2025), including Rarotonga (McCarthy and Elix 2018). On *Cocos nucifera*.

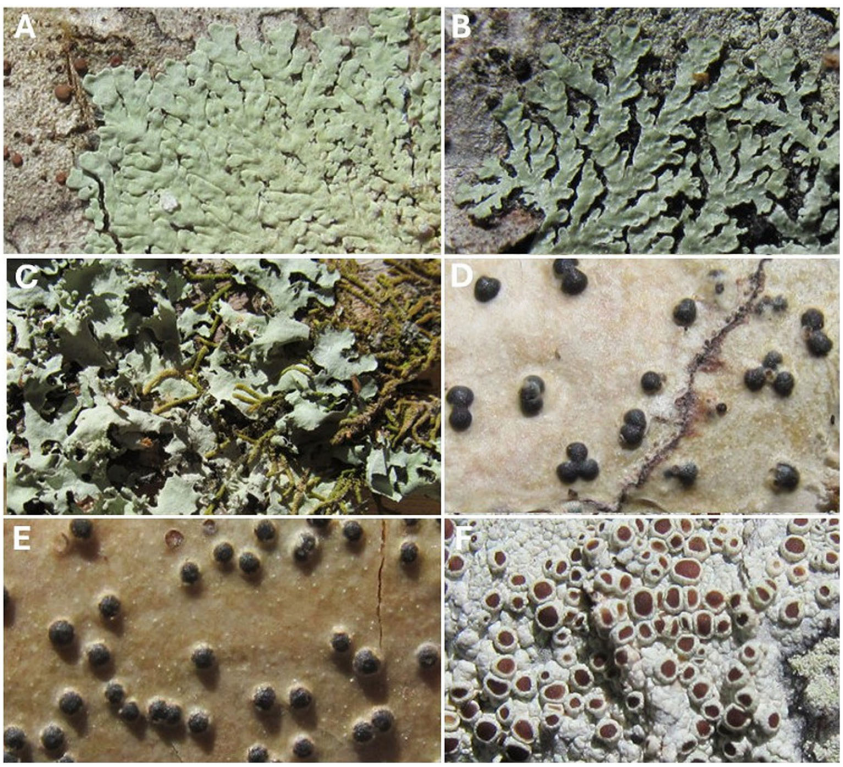

FIGURE 3 | Lichens present on Mangaia. (A) *Dirinaria applanata*; (B) *Pyxine fallax*; (C) *Parmotrema reticulatum*; (D) *Pyrenula astroidea*; (E) *Pyrenula thelomorpha*; and (F) *Lecanora tropica*.

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Dirinaria applanata (Fée) D.D.Awasthi

Specimens examined: Tamarua Village, Mangaia, *P. B. Heenan ML62*, 26 November 2024, CHR 697139; Oneroa, Mangaia, *P. B. Heenan ML96*, 27 November 2024, CHR 697172.

Notes: This almost ubiquitous lichen in tropical and warm-temperate regions occupies a range of habitats and substrata not unlike *D. aegialita* (Elix 2011). It is also common among the smaller Pacific islands (Elix and McCarthy 2008; McCarthy 2023; Galapagos Species Database 2025), including Rarotonga (McCarthy and Elix 2018). On *Cocos nucifera*.

Dirinaria picta (Sw.) Schaer. ex Clem.

Specimen examined: Rangimotia Rd, Mangaia, *P. B. Heenan ML84a*, 27 November 2024, CHR 697160.

Notes: This subcosmopolitan species of various substrata in lowland to montane habitats occurs on islands throughout the Pacific Ocean (Elix and McCarthy 2008). Reported from Rarotonga by Vainio (1924), but not seen subsequently. Collected on bark of *Hibiscus tiliaceus*.

Gassicurtia catasema (Tuck.) Marbach

Specimens examined: Tamarua Village, Mangaia, *P. B. Heenan ML26*, 25 November 2024, CHR 697108; *loc. id.*, Mangaia, *P. B. Heenan ML31*, 25 November 2024, CHR 697113; Kaumata, Mangaia, *P. B. Heenan ML46*, 26 November 2024, CHR 697126; Oneroa, Mangaia, *P. B. Heenan ML90*, 27 November 2024, CHR 697166; *loc. id.*, *P. B. Heenan ML100*, 27 November 2024, CHR 697176; *loc. id.*, *P. B. Heenan ML101*, 27 November 2024, CHR 697177; Tavaenga Road, Mangaia, *P. B. Heenan ML135*, 29 November 2024, CHR 697211.

Notes: Previously known from Africa, Australia, North, Central and South America and the Hawaiian Islands (Marbach 2000; Elix 2008). On *Cocos nucifera* and *Fagraea berteroana*.

Gassicurtia manguensia Marbach

Specimen examined: Kaumata, Mangaia, *P. B. Heenan ML38*, 26 November 2024, CHR 697118.

Notes: A most remarkable new record, the lichen was previously known only from the type collection from mangrove bark in south-eastern Brazil (Marbach 2000). On trunk of *Fagraea berteroana*.

Pyxine fallax (Zahlbr.) Kalb (Figure 3)

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML1*, 25 November 2024, CHR 697084; *loc. id.*, Mangaia, *P. B. Heenan ML4*, 25 November 2024, CHR 697087; *loc. id.*, Mangaia, *P. B. Heenan ML8*, 25 November 2024, CHR 697091; Tamarua Village, Mangaia, *P. B. Heenan ML29*, 25 November 2024, CHR 697111; *loc. id.*, *P. B. Heenan ML30*, 25 November 2024, CHR 697112; Kaumata, Mangaia, *P. B. Heenan ML38*, 26 November 2024, CHR 697118; Rangimotia, Mangaia, *P. B. Heenan ML74*, 27 November 2024, CHR 697150.

Notes: This rather common, corticolous lichen in Mangaia is already known from Brazil, South-east Asia and tropical and warm-temperate Australia (Elix 2011). In the Pacific, it occurs in Ogasawara-Shoto (Bonin Islands), the Hawaiian Islands and Rarotonga (Elix and McCarthy 2008; McCarthy and Elix 2018). On *Cocos nucifera*, *Fagraea berteroana* and *Hibiscus tiliaceus*.

4.3 | Coccocarpiaceae

Coccocarpia erythroxyli (Spreng.) Swinscow & Krog

Specimen examined: Kaumata, Mangaia, *P. B. Heenan ML42*, 26 November 2024, CHR 697122.

Notes: This pantropical lichen is widespread across the Pacific Ocean, including New Caledonia, the Hawaiian Islands, Fiji, Tonga, Samoa, Niue and the Society Islands (Arvidsson 1982; Elix and McCarthy 2008; Elix et al. 2024). Collected from a trunk of *Fagraea berteroana*.

Coccocarpia pellita (Ach.) Müll.Arg.

Specimen examined: Oneroa, Mangaia, *P. B. Heenan ML70*, 26 November 2024, CHR 697147.

Notes: This is also almost ubiquitous among the smaller Pacific islands, and it occurs in New Caledonia, Fiji, Tuamotu, Samoa, Niue, the Society Islands and elsewhere (Arvidsson 1982; Elix and McCarthy 2008; Elix et al. 2024). Remarkably, both *C. pellita* and *C. erythroxyli* (above) are reported here for the first time from the Cook Islands. Collected from the trunk and branches of *Hibiscus tiliaceus*.

4.4 | Chrysothricaceae

Chrysothrix candelaris (L.) J.R.Laundon

Specimen examined: Kaumata, Mangaia, *P. B. Heenan ML37*, 26 November 2024, CHR 682174.

Notes: A cosmopolitan species previously known from Rarotonga (McCarthy and Elix 2018). Collected from a trunk of *Fagraea berteroana*.

4.5 | Collemataceae

Leptogium mastocheilum (Vain.) Kitaura & Marcelli

Specimen examined: Tamarua, Mangaia, *P. B. Heenan ML133*, 28 November 2024, CHR 697209.

Notes: Previously known only from the Society Islands and Vanuatu (Kitaura et al. 2015). Collected from *Cocos nucifera*.

4.6 | Graphidaceae

Allographa rimulosa (Mont.) Lücking & Kalb (Figure 4)

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML2*, 25 November 2024, CHR 697085; Rangimotia Rd, Mangaia, *P. B. Heenan ML113*, 27 November 2024, CHR 697189.

Notes: Known from South-east Asia, tropical Australia, the Neotropics and nearby subtropics (Archer 2009, as *Graphis rimulosa* (Mont.) Trevis.) and, in the Pacific, from New Caledonia, the Hawaiian Islands and the Galapagos Islands (Elix and McCarthy 2008, as *G. rimulosa*; Galapagos Species Database 2025). On *Cocos nucifera* and *Hibiscus tiliaceus*.

Glyphis cicatricosa Ach. (Figure 4)

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML88*, 27 November 2024, CHR 697164; *loc. id.*, *P. B. Heenan ML94*, 27 November 2024, CHR 697171; *loc. id.*, *P. B. Heenan ML105*, 27 November 2024, CHR 697181; Rangimotia Rd, Mangaia,

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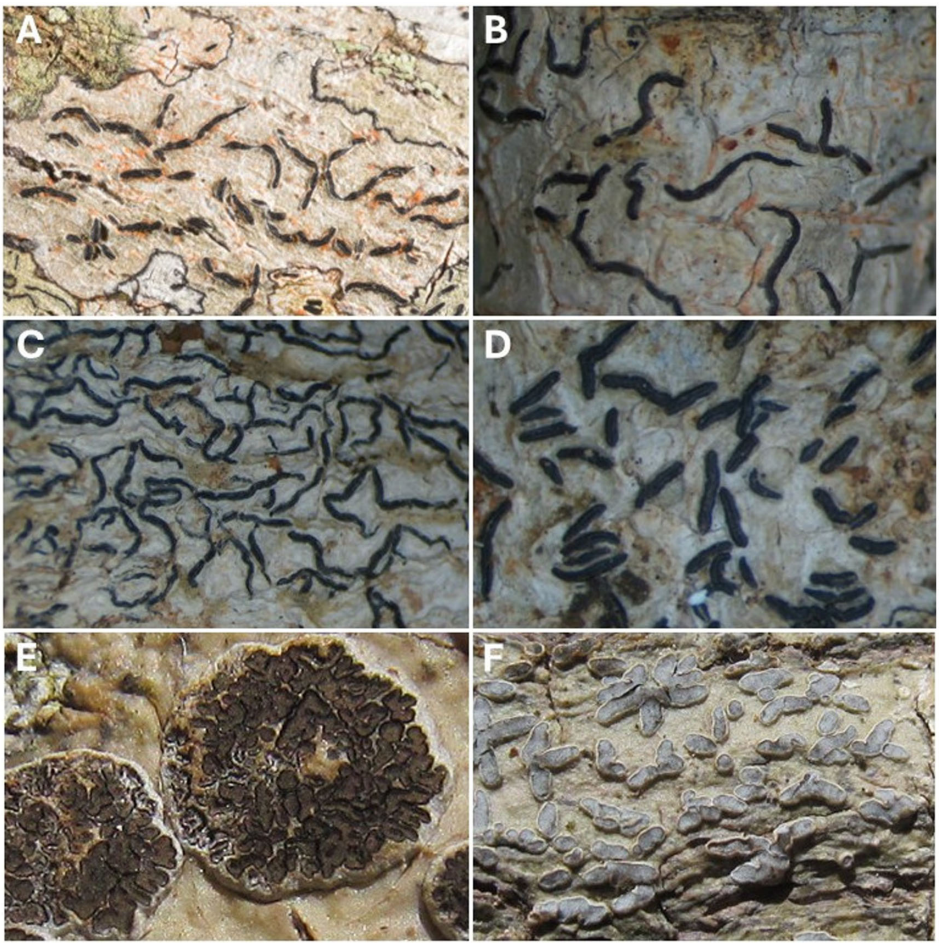

FIGURE 4 | Several species of Graphidaceae occur on Mangaia. (A) *Allographa rimulosa*; (B) *Graphis elegans*; (C) *Graphis stenotera;* (D) *Graphis virescens*; (E) *Glyphis cicatricosa*; and (F) *Leiorreuma exaltatum*.

P. B. Heenan ML111, 27 November 2024, CHR 697187; *loc. id.*, *P. B. Heenan ML112*, 27 November 2024, CHR 697188.

Notes: While two other *Glyphis* taxa are already known from Rarotonga (see below), the records from Mangaia are the first unambiguous collections of *G. cicatricosa sensu stricto* from the Cook Islands. Elsewhere, it is a common and well-distributed pantropical and subtropical lichen, its range including small islands throughout the Pacific Ocean (Elix and McCarthy 2008). On *Cocos nucifera* and *Hibiscus tiliaceus*.

Graphis elegans (Borrer ex Sm.) Ach. (Figure 4)

Specimens examined: Kaumata, Mangaia, *P. B. Heenan ML43*, 26 November 2024, CHR 697123; between airport and Oneroa, Mangaia, *P. B. Heenan ML144*, 29 November 2024, CHR 697220.

Notes: A subcosmopolitan, corticolous species with a known range that already includes New Caledonia and the Hawaiian Islands (Elix and McCarthy 2008). On *Cocos nucifera* and *Fagraea berteroana*.

Graphis lineola Ach.

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML88*, 27 November 2024, CHR 697164; *loc. id.*, *P. B. Heenan ML91*, 27 November 2024, CHR 697167; *loc. id.*, *P. B. Heenan ML94*, 27 November 2024, CHR 697170; *loc. id.*, *P. B. Heenan ML96*, 27 November 2024, CHR 697172; *loc. id.*, *P. B. Heenan ML106*, 27 November 2024, CHR 697182.

Notes: Found in the Neotropics, South and East Asia and eastern Australia (Archer 2009). In the Pacific region it is known from the Hawaiian Islands and Rapa Nui (Elix and McCarthy 2008). Comparatively common on *Cocos nucifera* in Mangaia.

Graphis stenotera Vain. (Figure 4)

Specimen examined: Rangimotia Rd, Mangaia, *P. B. Heenan ML79*, 27 November 2024, CHR 697155.

Notes: This rather uncommon, corticolous lichen is known from India, eastern Australia and the Philippines (Archer 2009). Reported here for the first time from the smaller Pacific islands. On *Hibiscus tiliaceus*.

Graphis virescens Müll.Arg. (Figure 4)

Specimen examined: Tavaenga Road, Mangaia, *P. B. Heenan ML143*, 29 November 2024, CHR 697219.

Notes: Known from Thailand, eastern Australia and the Neotropics (Archer 2009), *G. virescens* is newly reported from the Pacific islands. On *Cocos nucifera*.

Graphis sp. A (Figure 2)

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML3*, 25 November 2024, CHR 697086; Kaumata, Mangaia, *P. B. Heenan ML66*, 26 November 2024, CHR 697143; Rangimotia Rd, Mangaia, *P. B. Heenan ML113*, 27 November 2024, CHR 697189.

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Notes: Thallus pale to medium grey-green, thin, minutely uneven, continuous to sparingly rimose, K–, delimited by a black prothallus; lirellae semi-immersed, 0.6–2(–2.5) mm by 0.15–0.2 mm, dull black, straight or slightly curved, unbranched, with a thin thalline margin and a persistently closed, slit-like disc; proper exciple non-sulcate, carbonised at the sides and base; hymenium not inspersed with granular material or oil globules; ascospores hyaline, 8 per ascus, 8–10-locular, fusiform or somewhat clavate (broader at the distal end), 25–35 × 8–10 µm. On *Cocos nucifera* and *Pandanus tectorius*.

Graphis sp. B

Specimen examined: Tavaenga Road, Mangaia, *P. B. Heenan ML141*, 29 November 2024, CHR 697217.

Notes: Thallus off-white, thin, smooth, glossy, continuous to sparingly rimose, K–; lirellae very numerous, semi-immersed, 0.4–1.5(–3) mm by 0.1–0.15 mm, glossy black, simple to sparingly branched, with a thin thalline margin and a slit-like disc that can open at maturity; proper exciple completely carbonised; hymenium very heavily inspersed with granular material and oil globules; ascospores hyaline, 8 per ascus, 6-locular, fusiform, 14–18 × 4–6 µm. On *Cocos nucifera*.

Leiorreuma exaltatum (Mont. & Bosch) Staiger (Figure 4)

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML98a*, 27 November 2024, CHR 697174; *loc. id.*, *P. B. Heenan ML109*, 27 November 2024, CHR 697185.

Notes: This is a common, corticolous lichen in the Neotropics, the eastern Palaeotropics, eastern Australia, New Zealand and among the Pacific islands, the latter including New Caledonia, Vanuatu, Solomon Islands, Fiji, Samoa and the Hawaiian Islands (Elix and McCarthy 2008; Archer 2009). On *Cocos nucifera*.

Phaeographis sp. (Figure 2)

Specimens examined: Kaumata, Mangaia, *P. B. Heenan ML36a*, *b*, 26 November 2024, CHR 697116; Oneroa, Mangaia, *P. B. Heenan ML90*, 27 November 2024, CHR 697166; *loc. id.*, *P. B. Heenan ML106*, 27 November 2024, CHR 697182; Rangimotia Rd, Mangaia, *P. B. Heenan ML112*, 27 November 2024, CHR 697188; Tavaenga Road, Mangaia, *P. B. Heenan ML141*, 29 November 2024, CHR 697217.

Notes: Thallus endophloeodal, very thin, greyish, K–; lirellae numerous, stellate or more irregularly branched, the branches with a smooth, plane to slightly concave, open, greenish black disc 0.15–0.25 mm wide, and a thin, pale grey thalline margin; hymenium heavily inspersed; proper exciple brown-black, continuous and *c.* 40 µm thick beneath the hypothecium, not carbonised; ascospores 8 per ascus, pale to dark greyish brown, 4(–6)-locular, with rounded ends, 13–20 × 5.5–7 µm, thinly halonate. On *Cocos nucifera* and *Fagraea berteroana*.

4.7 | Gyalectaceae

Gyalecta subincolorella (Nyl.) Zahlbr.

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML91*, 27 November 2024, CHR 697167; *loc. id.*, *P. B. Heenan ML96*, 27 November 2024, CHR 697172.

Notes: First described from New Caledonia (Consortium of Lichen Herbaria 2025) and recently reported from Niue (Elix et al. 2024), this diminutive, inconspicuous and often overlooked lichen was collected from *Cocos nucifera* trunks.

4.8 | Lecanoraceae

Lecanora helva Stizenb.

Specimens examined: Tamakatea Village, Mangaia. *P. B. Heenan ML25*, 25 November 2024, CHR 697107; Oneroa, Mangaia, *P. B. Heenan ML91*, 27 November 2024, CHR 697167; *loc. id.*, *P. B. Heenan ML96*, 27 November 2024, CHR 697172; *loc. id.*, *P. B. Heenan ML97*, 27 November 2024, CHR 697173; *loc. id.*, *P. B. Heenan ML107*, 27 November 2024, CHR 697183; Tavaenga Road, Mangaia, *P. B. Heenan ML141*, 29 November 2024, CHR 697217.

Notes: A common, coastal, pantropical and warm-temperate lichen, its range in the Pacific includes Lord Howe Island and Norfolk Island (McCarthy 2023), New Zealand, Fiji and New Caledonia (Consortium of Lichen Herbaria 2025) and Niue (Elix et al. 2024). On *Cocos nucifera*.

Lecanora tropica Zahlbr. (Figure 3)

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML89*, 27 November 2024, CHR 697165; *loc. id.*, *P. B. Heenan ML93*, 27 November 2024, CHR 697169.

Notes: The distribution of this pantropical includes New Caledonia and the Galapagos Islands (Elix and McCarthy 2008) and Rarotonga (McCarthy and Elix 2018). On *Cocos nucifera*.

Vainionora aemulans (Vain.) Kalb

Specimen examined: Kaumata, Mangaia, *P. B. Heenan ML35*, 26 November 2024, CHR 697115.

Notes: Known from Brazil and eastern Australia, until now its only confirmed localities in the Pacific were from the Galapagos Islands (Galapagos Species Database 2025). On *Cocos nucifera*.

4.9 | Monoblastiaceae

Anisomeridium biforme (Borrer) R.C.Harris

Specimen examined: Tamarua, Mangaia, *P. B. Heenan ML124*, 28 November 2024, CHR 697200.

Notes: A new record for the Cook Islands, this subcosmopolitan lichen has been reported from Fiji (Elix and McCarthy 2008), Niue (Elix et al. 2024) and the Galapagos Islands (Galapagos Species Database 2025). On *Pandanus tectorius*.

Anisomeridium tamarindi (Fée) R.C.Harris

Specimen examined: Oneroa, Mangaia, *P. B. Heenan ML99*, 27 November 2024, CHR 697175.

Notes: This lowland pantropical lichen is known from New Caledonia (Elix and McCarthy 2008) and the Galapagos Islands (Galapagos Species Database 2025). On *Cocos nucifera*.

Anisomeridium terminatum (Nyl.) R.C.Harris

Specimen examined: Oneroa, Mangaia, *P. B. Heenan ML96*, 27 November 2024, CHR 697172.

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Notes: Among the smaller Pacific islands, this pantropical lichen is known only from Norfolk Island (McCarthy 2023). On *Cocos nucifera*.

4.10 | Opegraphaceae

Opegrapha dolomitica (Arnold) Clauzade & Cl.Roux ex Torrente & Egea

Specimen examined: Lake Tiriara, Mangaia, *P. B. Heenan ML83*, 27 November 2024, CHR 697159.

Notes: A small specimen collected from coastal makatea is a good match for the mainly boreal, but also southern-temperate *O. dolomitica* (Cannon et al. 2021). This lichen was also tentatively identified from among recent Niue collections by Elix et al. (2024).

4.11 | Pannariaceae

Physma byrsaeum (Ach.) Tuck.

Specimens examined: Tamarua Village, Mangaia, *P. B. Heenan ML64*, 26 November 2024, CHR 697141; *loc. id.*, *P. B. Heenan ML116*, 28 November 2024, CHR 697192.

Notes: A common corticolous lichen among the smaller islands of the South Pacific Ocean, including Fiji, Samoa and Pitcairn (Elix and McCarthy 2008), Niue (Elix et al. 2024) and Rarotonga (McCarthy and Elix 2018). On *Pandanus tectorius*.

4.12 | Parmeliaceae

Parmotrema reticulatum (Taylor) M.Choisy (Figure 3)

Specimen examined: Tavaenga Road, Mangaia, *P. B. Heenan ML139*, 29 November 2024, CHR 697215.

Notes: A common cosmopolitan lichen on bark in coastal to montane elevations throughout the islands of the Pacific Ocean (Elix and McCarthy 2008), *P. reticulatum* was first reported from Rarotonga by Louwhoff and Elix (2000). On *Cocos nucifera*.

Parmotrema tinctorum (Despr. ex Nyl.) Hale

Specimen examined: Tamarua Village, Mangaia, *P. B. Heenan ML33*, 25 November 2024, CHR 697222.

Notes: Common across the smaller Pacific islands (Elix and McCarthy 2008) and reported from Rarotonga (Louwhoff and Elix 2000). On *Cocos nucifera*.

Usnea nidifica Taylor (Figure 5)

Specimens examined: Tamarua Village, Mangaia, *P. B. Heenan ML27*, 25 November 2024, CHR 697109; *loc. id.*, Mangaia, *P. B. Heenan ML28*, 25 November 2024, CHR 697110; *loc. id.*, Mangaia, *P. B. Heenan ML73*, 25 November 2024, CHR 697226; Oneroa, Mangaia, *P. B. Heenan ML32*, 26 November 2024, CHR 697221; Kaumata Village, Mangaia, *P. B. Heenan ML49*, 26 November 2024, CHR 697223; Tavaenga Road, Mangaia, *P. B. Heenan ML137*, 29 November 2024, CHR 697213; loc. id., Mangaia, *P. B. Heenan ML138*, 29 November 2024, CHR 697214.

FIGURE 5 | Species of *Ramalina* and *Usnea* are conspicuous on the trunks of coconut (*Cocos nucifera*). (A) *Ramalina celastri*; (B) *Ramalina luciae;* (C) *Ramalina pacifica*; and (D) *Usnea nidifica*.

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Notes: The most widely distributed *Usnea* species among the Pacific islands (Elix and McCarthy 2008) and, along with *Ramalina luciae* (see below), the most commonly collected macrolichen in Mangaia. On *Cocos nucifera*.

4.13 | Pertusariaceae

Varicellaria velata (Turner) I.Schmitt & Lumbsch

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML5*, 25 November 2024, CHR 697088; Kaumata, *P. B. Heenan ML41*, 26 November 2024, CHR 697121; Tavaenga Road, Mangaia, *P. B. Heenan ML140*, 29 November 2024, CHR 697216.

Notes: A common, corticolous lichen in the Pacific region, its range includes Norfolk Island, New Caledonia, Vanuatu, Fiji, Samoa, the Hawaiian Islands, Rarotonga and the Society Islands (Elix and McCarthy 2008; McCarthy and Elix 2018). On *Cocos nucifera* and *Fagraea berteroana*.

4.14 | Physciaceae

Heterodermia tremulans (Müll.Arg.) W.L.Culb.

Specimen examined: Oneroa, Mangaia, *P. B. Heenan ML102*, 27 November 2024, CHR 697178.

Notes: Although scarcely known from the smaller Pacific islands, this is an otherwise pantemperate to pantropical lichen of bark, wood and rock in coastal and hinterland habitats (Elix 2011). On *Cocos nucifera*.

Physcia dactylifera Elix

Specimen examined: Tamarua, Mangaia, *P. B. Heenan ML128*, 28 November 2024, CHR 697204.

Notes: Known from the Neotropics, southern Africa and tropical Australia (Elix 2011), this coastal, corticolous and saxicolous species also occurs in Niue (Elix et al. 2024) and Rarotonga (McCarthy and Elix 2018). On trunk of *Pandanus tectorius*.

Physcia erumpens Moberg

Specimen examined: Oneroa, Mangaia, *P. B. Heenan ML108*, 27 November 2024, CHR 697184.

Notes: Found mainly on bark in coastal, warm-temperate regions of both hemispheres, this lichen is also known from the Galapagos Islands (Galapagos Species Database 2025) and Rarotonga (McCarthy and Elix 2018). On *Cocos nucifera*.

Physcia sorediosa (Vain.) Lynge

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML4*, 25 November 2024, CHR 697087; *loc. id.*, *P. B. Heenan ML34*, 26 November 2024, CHR 697114.

Notes: Most common in the Americas and the Palaeotropics and on islands in the central and northern Pacific Ocean (Elix and McCarthy 2008), *P. sorediosa* is also known from Lord Howe Island and Norfolk Island (McCarthy 2023), as well as Niue (Elix et al. 2024). On *Araucaria* and *Hibiscus tiliaceus*.

4.15 | Pilocarpaceae

Byssoloma subdiscordans (Nyl.) P.James

Specimen examined: Rangimotia Rd, Mangaia, *P. B. Heenan ML77*, 27 November 2024, CHR 697153.

Notes: This almost cosmopolitan lichen occurs on multiple substrata in most wet-tropical to temperate regions. Known from New Caledonia, the Hawaiian Islands and the eastern Pacific (Elix and McCarthy 2008), it is reported here for the first time from Polynesia, with several minute thalli being collected on pinnules of the fern *Angiopteris evecta* (G.Forst.) Hoffm.

Fellhanera bouteillei (Desm.) Vězda

Specimen examined: Rangimotia Rd, Mangaia, *P. B. Heenan ML77*, 27 November 2024, CHR 697153.

Notes: Has similar habitat preferences and global distribution to *Byssoloma subdiscordans*. The two species often grow on fern pinnules as adjacent minute colonies. 'Among the smaller Pacific islands, *F. bouteillei* is known only from New Caledonia and the Hawaiian Islands (Elix and McCarthy 2008).

4.16 | Porinaceae

Porina sp.

Specimen examined: Rangimotia, Mangaia, *P. B. Heenan ML76*, 27 November 2024, CHR 697152.

Notes: Thallus epiphloeodal, very thin, rather dark greyish green, continuous to sparingly rimose, minutely rugulose-verruculose, ecorticate; prothallus not apparent; photobiont *Trentepohlia*, with cells 8–18 × 8–14 μm; perithecia prominent, strongly convex to hemispherical, dull black, 0.12–0.22(–0.25) mm diameter, partly to almost completely overgrown by the thallus; involucrellum extending almost to exciple base level, greenish black in section (K + reddish), 20–30(–35) μm thick, not incorporating algae; ostiole inconspicuous; exciple 10–16 μm thick, with a hyaline inner layer and an outer greenish black zone; paraphyses simple, *c.* 1 μm thick; asci eight-spored, narrowly cylindrical, 70–84 × 10–15 μm, with a truncate apex; ascospores hyaline, fusiform, 5-septate at maturity, lacking a perispore, 23–28 × 4.5–7 μm [$n = 20$]; pycnidia not seen. The morphology of this specimen differs from that of other specimens within *Porina*. Further collections and molecular data are required to determine whether it represents a species new to science. However, it is currently known only as a very small (10 × 7 mm) fertile thallus on *Pinus caribaea*.

4.17 | Pyrenulaceae

Lithothelium obtectum (Müll.Arg.) Aptroot

Specimen examined: Oneroa, Mangaia, *P. B. Heenan ML9*, 25 November 2024, CHR 697092.

Notes: This lichen occurs in most tropical regions and in some more temperate localities, but among the smaller Pacific islands it has only been reported from Lord Howe Island (Aptroot 2008). On *Hibiscus tiliaceus*.

Pyrenula astroidea (Fée) R.C.Harris (Figure 3)

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML11*, 25 November 2024, CHR 697094; *loc. id.*, *P. B. Heenan ML96*, 27 November 2024, CHR 697172.

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Notes: This coastal, pantropical lichen is known from many of the smaller Pacific islands, including Rarotonga (Elix and McCarthy 2008). On *Cocos nucifera* and *Hibiscus tiliaceus*.

Pyrenula confinis (Nyl.) R.C.Harris

Specimens examined: Kaumata Village, Mangaia, *P. B. Heenan ML48*, 26 November 2024, CHR 697128; *loc. id.*, *P. B. Heenan ML55*, 26 November 2024, CHR 697133; *loc. id.*, *P. B. Heenan ML58*, 26 November 2024, CHR 697136; *loc. id.*, *P. B. Heenan ML66*, 26 November 2024, CHR 697143; Rangimotia Rd, Mangaia, *P. B. Heenan ML84b*, 27 November 2024, CHR 698122; *loc. id.*, *P. B. Heenan ML115*, 27 November 2024, CHR 697191; Oneroa, Mangaia, *P. B. Heenan ML91*, 27 November 2024, CHR 697167; *loc. id.*, *P. B. Heenan ML94*, 27 November 2024, CHR 697170; *loc. id.*, *P. B. Heenan ML96*, 27 November 2024, CHR 697172; *loc. id.*, *P. B. Heenan ML104*, 27 November 2024, CHR 697180; *loc. id.*, *P. B. Heenan ML105*, 27 November 2024, CHR 697181; Tamarua, Mangaia, *P. B. Heenan ML125*, 28 November 2024, CHR 697201.

Notes: The most commonly collected crustose lichen in Mangaia, this pantropical species is also known from New Caledonia and Rarotonga (Elix and McCarthy 2008), Niue (Elix et al. 2024) and the Galapagos Islands (Galapagos Species Database 2025). On *Cocos nucifera*, *Hibiscus tiliaceus* and *Pandanus tectorius*.

Pyrenula fetivica (Kremp.) Müll.Arg.

Specimen examined: Kaumata Village, Mangaia, *P. B. Heenan ML57*, 26 November 2024, CHR 697135.

Notes: This species was reported as *P.* aff. *citriformis* R.C.Harris from Rarotonga by McCarthy (2000a). That name was later included in the substantial synonymy of the pantropical *P. fetivica* by Aptroot (2012). Among the smaller Pacific islands, it is known from Fiji, the Cook Islands, the Hawaiian Islands (Elix and McCarthy 2008) and the Galapagos Islands (Galapagos Species Database 2025). On *Pandanus tectorius*.

Pyrenula microcarpa Müll.Arg.

Specimen examined: Oneroa, Mangaia, *P. B. Heenan ML10a*, 25 November 2024, CHR 697093.

Notes: The distribution of this pantropical and warm-temperate lichen includes Lord Howe Island and Norfolk Island in the south-western Pacific (Aptroot 2008), as well as the Galapagos Islands in the east (Galapagos Species Database 2025). On *Hibiscus tiliaceus*.

Pyrenula nitidula (Bres.) R.C.Harris

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML91*, 27 November 2024, CHR 697167; *loc. id.*, *P. B. Heenan ML95*, 27 November 2024, CHR 697171.

Notes: The Pacific distribution of this pantropical lichen includes Lord Howe Island and Norfolk Island (Aptroot 2008), the Hawaiian Islands and Rarotonga (Elix and McCarthy 2008), and the Galapagos Islands (Galapagos Species Database 2025). On *Cocos nucifera*.

Pyrenula ochraceoflava (Nyl.) R.C.Harris var. ***ochraceoflava***

Specimens examined: Tamakatea Village, Mangaia, *P. B. Heenan ML17*, 25 November 2024, CHR 697100; Kaumata Village, Mangaia, *P. B. Heenan ML54*, 26 November 2024, CHR 697132; Tamarua, Mangaia, *P. B. Heenan ML120*, 28 November 2024, CHR 697196; *loc. id.*, *P. B. Heenan ML124*, 28 November 2024, CHR 697200; *loc. id.*, *P. B. Heenan ML129*, 28 November 2024, CHR 697205; *loc. id.*, *P. B. Heenan ML130*, 28 November 2024, CHR 697206.

Notes: Common on bark in coastal habitats throughout the tropics, this lichen is known from numerous South Pacific islands, including Rarotonga (Elix and McCarthy 2008). Collected from bark of *Cocos nucifera*, *Hibiscus tiliaceus* and *Pandanus tectorius*.

Pyrenula ochraceoflava var. ***pacifica*** P.M.McCarthy

Specimen examined: Oneroa, Mangaia, *P. B. Heenan ML97*, 27 November 2024, CHR 697173.

Notes: Based on a Rarotongan type specimen (McCarthy 2000a), this littoral lichen has subsequently been reported from Fiji (McCarthy 2000b) and Niue (Elix et al. 2024). Collected from tree bark.

Pyrenula quassiaecola Fée

Specimen examined: Kaumata, Mangaia, *P. B. Heenan ML45*, 26 November 2024, CHR 697125.

Notes: This pantropical to warm-temperate lichen of lowland to montane elevations is known from Lord Howe Island and Norfolk Island (Aptroot 2008), also New Caledonia, the Hawaiian Islands and the Galapagos Islands (Galapagos Species Database 2025). On *Cocos nucifera*.

Pyrenula thelomorpha Tuck. (Figure 3)

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML11*, 25 November 2024, CHR 697094; *loc. id.*, *P. B. Heenan ML97*, 27 November 2024, CHR 697173; *loc. id.*, *P. B. Heenan ML98b*, 27 November 2024, CHR 698121; *loc. id.*, *P. B. Heenan ML104*, 27 November 2024, CHR 697180; *loc. id.*, *P. B. Heenan ML105*, 27 November 2024, CHR 697181.

Notes: In the smaller islands of the Pacific region, this mainly lowland, tropical species is known only from the Galapagos Islands (Galapagos Species Database 2025). On *Cocos nucifera* and *Hibiscus tiliaceus*.

4.18 | Ramalinaceae

Megalaria sp. (Figure 2)

Specimen examined: Rangimotia Rd, Mangaia, *P. B. Heenan ML82*, 27 November 2024, CHR 697158.

Notes: Thallus epiphloeodal, whitish to pale grey, continuous to sparingly rimose, coarsely uneven; soredia and isidia absent; apothecia sessile, 0.5–1.2(–1.7) mm wide, with a plane to convex, greenish black disc and an entire, pale grey proper margin that becomes excluded with age; proper exciple cupulate, 60–120 µm thick, of hyaline, thick-walled, radiating hyphae; hypothecium 100–150 µm thick, dark olive-green; epihymenium poorly delimited; asci narrowly clavate to clavate-cylindrical; ascospores oblong-ellipsoid to almost fusiform, hyaline, 1-septate (some with 1 or 2 additional pseudosepta), 12–18 × 3.5–5.5 µm. On *Hibiscus tiliaceus*.

Ramalina celastri (Spreng.) Krog & Swinscow (Figure 5)

Specimens examined: Oneroa, Mangaia, *P. B. Heenan ML6*, 25 November 2024, CHR 697089; *loc. id.*, *P. B. Heenan ML86*, 27 November 2024, CHR 697162; Kaumata Village, Mangaia, *P. B. Heenan ML50*, 26 November 2024, CHR 697129;

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Tamarua Village, Mangaia, *P. B. Heenan ML63a*, 26 November 2024, CHR 697140; Tavaenga Road, Mangaia, *P. B. Heenan ML136*, 29 November 2024, CHR 697212.

Notes: Widespread across the islands of the Pacific Ocean, including the Kermadec Islands, New Caledonia, Niue and the Hawaiian Islands (Elix and McCarthy 2008). Reported here for the first time from the Cook Islands. On *Cocos nucifera*, *Pandanus tectorius* and *Hibiscus tiliaceus*.

Ramalina luciae Molho, Bodo, W.L.Culb. & C.F.Culb. (Figure 5)

Specimens examined: opposite Oneroa, Mangaia, *P. B. Heenan ML7*, 25 November 2024, CHR 697090; Kaumata Village, Mangaia, *P. B. Heenan ML52*, 26 November 2024, CHR 697131; *loc. id.*, *P. B. Heenan ML53*, 26 November 2024, CHR 697224; *loc. id.*, *P. B. Heenan ML57*, 26 November 2024, CHR 697135; Tamarua Village, Mangaia, *P. B. Heenan ML63a*, 26 November 2024, CHR 697140; *loc. id.*, *P. B. Heenan ML132*, 28 November 2024, CHR 697208; Tavaenga Road, Mangaia, *P. B. Heenan ML134*, 29 November 2024, CHR 697210.

Notes: Previously reported from Mangaia by Blanchon and de Lange (2011), this lichen is widespread among the islands of the Pacific Ocean, including Vanuatu, Fiji, Kermadec Islands, Niue and Rarotonga (Elix and McCarthy 2008). On *Cocos nucifera*, *Pandanus tectorius* and *Hibiscus tiliaceus*.

Ramalina pacifica Asah. (Figure 5)

Specimens examined: Kaumata Village, Mangaia, *P. B. Heenan ML57*, 26 November 2024, CHR 697135; Tamarua Village, Mangaia, *P. B. Heenan ML60*, 26 November 2024, CHR 697225.

Notes: This Palaeotropical lichen is known from Lord Howe Island and Norfolk Island (McCarthy 2023), as well as Vanuatu, Fiji, the Kermadec Islands and Rarotonga (Elix and McCarthy 2008). On *Pandanus tectorius*.

Ramalina peruviana Ach.

Specimens examined: Rangimotia Rd, Mangaia, *P. B. Heenan ML78b*, 27 November 2024, CHR 698123; Tamarua, Mangaia, *P. B. Heenan ML132*, 28 November 2024, CHR 697208.

Notes: Widespread across the Pacific Ocean islands, including Norfolk Island (McCarthy 2023), the Hawaiian Islands, Kermadec Islands and New Caledonia (Elix and McCarthy 2008); also in Niue (Elix et al. 2024), Rarotonga (Blanchon and de Lange 2011) and the Galapagos Islands (Galapagos Species Database 2025). On *Cocos nucifera* and *Hibiscus tiliaceus*.

4.19 | Roccellaceae

Enterographa pallidella (Nyl.) Redinger

Specimens examined: Tamarua, Mangaia, *P. B. Heenan ML117*, 28 November 2024, CHR 697193; *loc. id.*, *P. B. Heenan ML118*, 28 November 2024, CHR 697194; loc. id., *P. B. Heenan ML123*, 28 November 2024, CHR 697199.

Notes: The known range of this pantropical and warm-temperate, corticolous lichen includes the Hawaiian Islands and the Society Islands (Elix and McCarthy 2008). On *Pandanus tectorius*.

4.20 | Strigulaceae

Dichoporis bermudana (Tuck.) S.H.Jiang, Lücking & Sérus.

Specimens examined: Temakatea Village, Mangaia, *P. B. Heenan ML15*, 25 November 2024, CHR 697098; *loc. id.*, *P. B. Heenan ML22*, 25 November 2024, CHR 697104; *loc. id.*, *P. B. Heenan ML20*, 25 November 2024, CHR 697102; *loc. id.*, *P. B. Heenan ML23*, 25 November 2024, CHR 697105.

Notes: Also known from limestone in Bermuda, the Caribbean region, Christmas Island (Indian Ocean) and the Solomon Islands (McCarthy 2013, as *Strigula bermudana* (Nyl.) R.C.Harris). The specimens collected on makatea in Mangaia are unusual in that up to 5%–10% of mature ascospores can have 2 or 3 eusepta, in contrast to the almost persistently 1-septate ascospores that characterised the recently segregated *Dichoporis bermudana* (Hongsanan et al. 2020).

4.21 | Trypetheliaceae

Polymeridium sp. A

Specimens examined: Kaumata, Mangaia, *P. B. Heenan ML36a*, 26 November 2024, CHR 697116; Tamarua, Mangaia, *P. B. Heenan ML124*, 28 November 2024, CHR 697200.

Notes: Thallus endophloeodal, nondescript; photobiont *Trentepohlia*; perithecia immersed, solitary, apically flat, with a broadly spreading, black involucrellum (to 0.6 diam.) and a paler apical ostiole; hymenium not inspersed with granules or oil globules; exciple thin, brown-black, 0.2–0.3 mm diam.; asci cylindrical, 8-spored; pseudoparaphyses loosely anastomosing; ascospores biseriate in the asci, euseptate, fusiform, hyaline, transversely 5-septate, but often with 1 or 2 longitudinal or diagonal septa, browning when post-mature, 15–23 × 5–7 µm, at first thinly halonate (see Aptroot and Lücking 2016). On *Pandanus tectorius*.

Polymeridium sp. B

Specimen examined: Kaumata Village, Mangaia, *P. B. Heenan ML56*, 26 November 2024, CHR 697134.

Notes: Thallus endophloeodal, nondescript; photobiont *Trentepohlia*; perithecia prominent, sessile, glossy black, 0.1–0.15 mm diam., with an apical ostiole; hymenium not inspersed; exciple hyaline; asci cylindrical, 8-spored; pseudoparaphyses loosely anastomosing; ascospores biseriate in the asci, euseptate, fusiform, hyaline, 3-septate, 13–17 × 4.5–7 µm, at first thinly halonate (see Aptroot and Lücking 2016). On bark of an unknown host.

Pseudobogoriella lateralis (Sipman) Lücking, R.Miranda & Aptroot

Specimen examined: Oneroa, Mangaia, *P. B. Heenan ML10b*, 25 November 2024, CHR 697093.

Notes: Previously known only from Norfolk Island in the southwestern Pacific Ocean (Sipman and Aptroot 2005, as *Mycomicrothelia*), it is reported here from the bark of *Hibiscus tiliaceus*.

4.22 | Verrucariaceae

Bagliettoa baldensis (A.Massal.) Vězda

Specimens examined: Temakatea Village, Mangaia, *P. B. Heenan ML13*, 25 November 2024, CHR 697096; *loc. id.*, *P. B. Heenan*

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ML14, 25 November 2024, CHR 697097; *loc. id.*, *P. B. Heenan ML21*, 25 November 2024, CHR 697103; Oneroa, Mangaia, *P. B. Heenan ML12*, 25 November 2024, CHR 697095; *loc. id.*, *P. B. Heenan ML67*, 26 November 2024, CHR 697144; *loc. id.*, *P. B. Heenan ML68*, 26 November 2024, CHR 697145.

Notes: Almost certainly under-reported, but probably subcosmopolitan, this lichen has only recently been documented for the first time from a remote Pacific island (Niue, Elix et al. 2024). Probably the most common lichen on makatea in Mangaia.

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Conflicts of Interest

The authors declare no conflicts of interest.

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Appendix

Checklist of lichens of the Cook Islands

This checklist updates McCarthy and Elix (2018) in summarising lichens of the Cook Islands by adding the 66 Mangaia records documented herein, bringing the total to 156 species and infraspecific taxa. Distribution in the Cook Islands is represented by the following symbols:
* Aitutaki only;

+ Mangaia only; # Rarotonga only; × Rarotonga and Mangaia.

Taxon	Distribution	Reference
Acarospora aff. veronensis A.Massal.	#	McCarthy and Elix (2018)
Allographa rimulosa (Mont.) Lücking & Kalb	+	This article
Amandinea efflorescens var. *pseudohypopelidna* Marbach	#	McCarthy and Elix (2018)
Anisomeridium anisolobum (Müll.Arg.) Aptroot	#	McCarthy (2000a)
Anisomeridium biforme (Borrer) R.C.Harris	+	This article
Anisomeridium carinthiacum (J.Steiner) R.C.Harris	#	McCarthy (2000a)
Anisomeridium consobrinum (Nyl.) Aptroot	#	McCarthy (2000a)
Anisomeridium tamarindi (Fée) R.C.Harris	+	This article
Anisomeridium terminatum (Nyl.) R.C.Harris	+	This article
Arthonia sp.	+	This article
Bagliettoa baldensis (A.Massal.) Vězda	+	This article
Buellia bahiana Malme	#	Elix (2016)
Buellia rarotongensis Elix	#	Elix (2016)
Bulbothrix goebelii (Zenker) Hale	#	Louwhoff and Elix (2000)
Bulbothrix isidiza (Nyl.) Hale	#	Louwhoff and Elix (2000)
Bulbothrix tabacina (Mont. & Bosch) Hale	#	Louwhoff and Elix (2000)
Byssoloma subdiscordans (Nyl.) P.James	+	This article
Calicium hyperelloides Nyl.	+	This article
Calopadia vermiculifera (Vain.) Sérus.	#	McCarthy and Elix (2018)
Canoparmelia rarotongensis Louwhoff & Elix	#	Louwhoff and Elix (2000)
Celothelium cinchonarum (Müll.Arg.) Vain.	#	McCarthy (2000a)
Chrysothrix candelaris (L.) J.R.Laundon	×	McCarthy and Elix (2018); this article
Coccocarpia erythroxyli (Spreng.) Swinscow & Krog	+	This article
Coccocarpia palmicola (Spreng.) Arv. & D.J.Galloway	#	Arvidsson (1982)
Coccocarpia pellita (Ach.) Müll.Arg.	+	This article
Coenogonium lutescens (Vězda & Malcolm) Malcolm	#	McCarthy and Elix (2018)
Coenogonium queenslandicum (Kalb & Vězda) Lücking	#	McCarthy and Elix (2018)
Collema rugosum Kremp.	*	Degelius (1974)
Cratiria chloraceus Marbach	+	This article
Cratiria lauricassiae (Fée) Marbach	+	This article
Cratiria obscurior (Stirt.) Marbach & Kalb	+	This article
Dichoporis bermudana (Tuck.) S.H.Jiang, Lücking & Sérus.	+	This article
Diorygma pruinosum (Eschw.) Kalb, Staiger & Elix	#	McCarthy and Elix (2018)

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Taxon	Distribution	Reference
Dirinaria aegialita (Ach.) B.Moore	×	McCarthy and Elix (2018); this article
Dirinaria applanata (Fée) D.D.Awasthi	×	McCarthy and Elix (2018); this article
Dirinaria picta (Sw.) Schaer. ex Clem.	×	Vainio (1924); this article
Enterographa pallidella (Nyl.) Redinger	+	This article
Fellhanera bouteillei (Desm.) Vězda	+	This article
Gassicurtia catasema (Tuck.) Marbach	+	This article
Gassicurtia manguensia Marbach	+	This article
Gassicurtia subpulchella (Vain.) Marbach	#	Elix (2016)
Glyphis cicatricosa Ach.	+	This article
Glyphis cicatricosa var. *simplicior* (Vain.) Zahlbr.	#	Sbarbaro (1939)
Glyphis parksiana Räsänen	#	Räsänen (1944)
Graphis elegans (Borrer ex Sm.) Ach.	#	This article
Graphis furcata Fée	#	McCarthy and Elix (2018)
Graphis lineola Ach.	+	This article
Graphis stenotera Vain.	+	This article
Graphis virescens Müll.Arg.	+	This article
Graphis sp. A	+	This article
Graphis sp. B	+	This article
Gyalecta subincolorella (Nyl.) Zahlbr.	+	This article
Heterodermia isidiophorella Elix	#	McCarthy and Elix (2018)
Heterodermia japonica (Sato) Swinscow & Krog	#	McCarthy and Elix (2018)
Heterodermia obscurata (Nyl.) Trevis.	#	McCarthy and Elix (2018)
Heterodermia propagulifera (Vain.) Dey	#	McCarthy and Elix (2018)
Heterodermia tremulans (Müll.Arg.) W.L.Culb.	+	This article
Lecanographa solicola P.M.McCarthy & Elix	#	McCarthy and Elix (2018)
Lecanora helva Stizenb.	+	This article
Lecanora leprosa Fée	#	Sbarbaro (1939)
Lecanora tropica Zahlbr.	×	McCarthy and Elix (2018); this article
Leiorreuma exaltatum (Mont. & Bosch) Staiger	+	This article
Leptogium azureum (Sw. ex Ach.) Mont.	#	Sbarbaro (1939)
Leptogium cyanescens var. *trachynum* Vain.	#	Sbarbaro (1939)
Leptogium diaphanum (Mont.) Nyl.	#	Jatta (1903)
Leptogium fallax Müll.Arg.	#	Jatta (1903)
Leptogium mastocheilum (Vain.) Kitaura & Marcelli	+	This article
Leptogium moluccanum var. *hypoleia* Vain.	#	Sbarbaro (1939)
Lithothelium obtectum (Müll.Arg.) Aptroot	+	This article
Megalaria sp.	+	This article
Megalospora aff. austropacifica Lumbsch, Naikatini & Lücking	#	McCarthy and Elix (2018)
Megalospora sulphurata Meyen var. *sulphurata*	#	McCarthy and Elix (2018)
Opegrapha dolomitica (Arnold) Clauzade & Cl.Roux ex Torrente & Egea	+	This article
Parmotrema cristiferum (Taylor) Hale	#	Louwhoff and Elix (2000)
Parmotrema endosulphureum (Hillm.) Hale	#	Louwhoff and Elix (2000)
Parmotrema reticulatum (Taylor) M.Choisy	×	Louwhoff and Elix (2000); this article
Parmotrema saccatilobum (Taylor) Hale	#	Louwhoff and Elix (2000)
Parmotrema tinctorum (Despr. ex Nyl.) Hale	×	Louwhoff and Elix (2000); this article
Pertusaria atroguttata A.W.Archer & Elix	#	Archer and Elix (2015)
Pertusaria commutata Müll.Arg.	#	Archer and Elix (2015)
Pertusaria homilocarpa A.W.Archer & Elix	#	Archer and Elix (2015)
Pertusaria megacarpa A.W.Archer & Elix	#	Archer and Elix (2015)
Pertusaria montpittensis A.W.Archer	#	Archer and Elix (2015)
Pertusaria rarotongensis A.W.Archer & Elix	#	Archer and Elix (2015)
Pertusaria rarotongensis var. *stictica* A.W.Archer & Elix	#	Archer and Elix (2015)
Pertusaria thiospoda C.Knight	#	Archer and Elix (2015)
Phaeographis sp.	+	This article
Physcia dactylifera Elix	×	McCarthy and Elix (2018); this article
Physcia erumpens Moberg	×	McCarthy and Elix (2018); this article

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Taxon	Distribution	Reference
Physcia integrata Nyl.	#	McCarthy and Elix (2018)
Physcia sorediosa (Vain.) Lynge	+	This article
Physcia undulata Moberg	#	McCarthy and Elix (2018)
Physma byrsaeum (Ach.) Tuck.	×	Sbarbaro (1939; as *P. byrsinum*); this article
Polymeridium sp. A	+	This article
Polymeridium sp. B	+	This article
Porina aff. cestrensis (Tuck. ex Mich.) Müll.Arg.	#	McCarthy (2000a)
Porina deminuta P.M.McCarthy	#	McCarthy (2000a)
Porina exocha (Nyl.) P.M.McCarthy	#	McCarthy (2000a)
Porina farinosa C.Knight	#	McCarthy (2000a)
Porina guentheri (Flot.) Zahlbr.	#	McCarthy (2000a)
Porina mastoidea (Ach.) Müll.Arg.	#	McCarthy (2000a)
Porina nucula Ach.	#	McCarthy (2000a)
Porina perminuta Vain.	#	McCarthy (2000a)
Porina subinterstes (Nyl.) Müll.Arg.	#	McCarthy (2000a)
Porina tetracerae (Ach.) Müll.Arg.	#	McCarthy (2000a)
Porina sp.	+	This article
Pseudobogoriella lateralis (Sipman) Lücking, R.Miranda & Aptroot	+	This article
Pseudocyphellaria argyracea (Delise) Vain.	#	McCarthy and Elix (2018)
Pseudocyphellaria desfontainii (Delise) Vain.	#	Sbarbaro (1939)
Pseudocyphellaria homalosticta Vain.	#	Galloway (1994)
Pseudocyphellaria intricata (Delise) Vain.	#	Sbarbaro (1939)
Pseudocyphellaria louwhoffiae Elix	#	McCarthy and Elix (2018)
Pseudocyphellaria prolificans (Nyl.) Vain.	#	Galloway (1994)
Pyrenula astroidea (Fée) R.C.Harris	×	McCarthy (2000a); this article
Pyrenula concatervans (Nyl.) R.C.Harris	#	McCarthy (2000a)
Pyrenula confinis (Nyl.) R.C.Harris	×	McCarthy (2000a); this article
Pyrenula fetivica (Kremp.) Müll.Arg.	×	McCarthy (2000a, as *P. aff. citriformis* R.C.Harris); this article
Pyrenula leucostoma Ach.	#	McCarthy (2000a)
Pyrenula macularis (Zahlbr.) R.C.Harris	#	McCarthy (2000a)
Pyrenula microcarpa Müll.Arg.	+	This article
Pyrenula nitidula (Bres.) R.C.Harris	×	McCarthy (2000a); this article
Pyrenula ochraceoflava (Nyl.) R.C.Harris	×	McCarthy (2000a); this article
Pyrenula ochraceoflava var. *pacifica* P.M.McCarthy	×	McCarthy (2000a); this article
Pyrenula philippina var. *oceanica* Sbarbaro	#	Sbarbaro (1939)
Pyrenula quassiaecola Fée	+	This article
Pyrenula thelomorpha Tuck.	+	This article
Pyxine cocoes (Sw.) Nyl.	#	McCarthy and Elix (2018)
Pyxine fallax (Zahlbr.) Kalb	×	McCarthy and Elix (2018); This article
Pyxine farinosa Kashiw.	#	McCarthy and Elix (2018)
Pyxine retirugella Nyl.	#	McCarthy and Elix (2018)
Ramalina australiensis Nyl.	#	Blanchon and de Lange (2011)
Ramalina celastri (Spreng.) Krog & Swinscow	+	This article
Ramalina microspora Kremp.	#	Blanchon and de Lange (2011)
Ramalina leiodea (Nyl.) Nyl.	#	Blanchon and de Lange (2011)
Ramalina luciae Molho, Bodo, W.L.Culb. & C.F.Culb.	×	Blanchon and de Lange (2011); this article
Ramalina pacifica Asah. var. *pacifica*	×	Stevens (1983); this article
Ramalina peruviana Ach.	×	Blanchon and de Lange (2011); this article
Ramalina subcomplanata Nyl.	#	Sbarbaro (1939)
Ramalina subfraxinea Nyl.	#	Sbarbaro (1939)
Sporopodium phyllocharis (Mont.) A.Massal.	#	McCarthy and Elix (2018)
Sticta sinuosa Pers.	#	Sbarbaro (1939)
Strigula smaragdula Fr.: Fr.	#	McCarthy (2000a)
Swinscowia decipiens (Malme) S.H.Jiang, Lücking & Sérus.	#	McCarthy (2000a, as *Strigula*)
Swinscowia divisa (P.M.McCarthy) S.H.Jiang, Lücking & Sérus.	#	McCarthy (2000a, as *Strigula*)

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Taxon	Distribution	Reference
Swinscowia "sp. A"	#	McCarthy (2000a, as *Strigula*)
Thelotrema diplotrema Nyl.	#	McCarthy and Elix (2018)
Thelotrema monosporum Nyl.	#	Sbarbaro (1939)
Trichothelium assurgens (Cooke) Aptroot & Lücking	#	McCarthy (2000a)
Usnea fautauenis Vain.	#	Sbarbaro (1939)
Usnea nidifica Taylor	×	Motyka (1936–38); this article
Vainionora aemulans (Vain.) Kalb	+	This article
Varicellaria velata (Turner) I.Schmitt & Lumbsch	×	Archer and Elix (2015); this article
Verrucaria fortuita P.M.McCarthy	#	McCarthy (2000a)
Verrucaria fuscella (Turner) Winch	#	McCarthy (2000a)
Verrucaria howensis P.M.McCarthy	#	McCarthy (2000a)
Verrucaria mundula P.M.McCarthy	#	McCarthy (2000a)
Xanthoparmelia subramigera (Gyeln.) Hale	#	Louwhoff and Elix (2000)

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